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## Course Description

Plant Biotechnology is a course that provides students with an opportunity to develop an understanding of the principles and practices of plant tissue culture and biotechnology regarding agriculturally-related products and services. Topics include introduction of plant biotechnology, plant tissue culture (overview), plant transformation, transgenic plants and biosafety & regulation of GM plants. This course will provide an insight into plant biotechnology theory and applications, especially GM plants, to produce new products for medicine, industry and environment.

## Course Plan

Lecture	Sub.	Topic	Hours	Reference
1	1.1	History of plant breeding	2	Part.I
	1.2-1.5	Plant biotechnology	3	Part.I
2	2.1	Plant tissue culture techniques	2	Part.II
	2.2	Cellular totipotency, plant regeneration	2	Part II
	2.3	Application of plant tissue culture	3	Part. II
3	3.1-3.2	Target gene(s)-cloning in plants	3	Part. III
	3.3.1	Transformation methods (direct-)	2	Part.III
	3.3.2	Transformation methods (indirect-)	3	Part. III
4	4.1	Making a Transgenic plant	2	Part. IV

	4.2- 4.3	Selection and detection of transgenic plant	2	Part. IV
5	5.1	Herbicide resistant plants	2	Part. V
	5.2- 5.3	Insect-virus resistant plants	2	Part. V
	5.4	Improve the post- harvest	3	Part. V
6	6.1	Improve the nutritive value	3	Part. VI
	6.2	Modify LC-PUFAs contents	2	Part. VI
	6.3	New horticultural varieties	2	Part.VII
7	7.1- 7.4	Molecular pharming	3	Part. VII
	7.5- 7.9	PHB –Salt tolerance	2	Part. VII
8	8.1- 8.2	Biosafety & Regulation	2	Part VIII

## Course Grading

### **Topics in Plant Biotechnology**

Oral presentation: 20 points

Written report: 20 points

Comprehensive Examination: 60 points

Total: 100 points

### **Recommended reading**

1. Plant Cell and tissue Culture . In Methods in Molecular Biology, vol. 6, Edited by Jeffrey W Pollard and John M Walker, Humana Press. 1990.
2. Plant Propagation by Tissue Culture: Volume 1. The Background, Edited by E. F. George et al., Springer, 2008.
3. Agrobacterium Protocols, Volume 1-2. In Methods in Molecular Biology, vol. 343-344, Edited by Kan Wang, Human Press, 2006.
4. Plant Biotechnology.: Current and Future Applications of Genetically Modified Crops Edited by Nigel Halford. John Wiley & Sons, 2006.

## Time Table

### **Oral presentations**

The oral report of the plant biotechnology topic will be presented during the last two class periods by teams. Each team should select a single key, but current, reference (2000-present) to use as the principal focal point for the report. Select a biotechnology paper for the report from Trends in Plant Science, Current Opinions in Plant Biology, Science, Nature, Nature Biotechnology, Nature Genetics, Proceedings of the National Academy of Sciences, etc.. These journals are recommended because of the concise and precise presentation style that is used. The outlines or key contents will be rectified by lecturer during the class. The report will include a formal presentation (no longer than 15 minutes) and a question/answer period (5 minutes).

### **Written report**

Each member of the team will prepare, independently, written report (Fifty to twenty pages maximum with literature citations). References cited within the principal paper will be useful information sources.

### **Comprehensive Examination**

Final examination: multiple choices / fill in blank / diagram questions.

## Lecture Notes

LECTURE	TITLE	DOWNLOAD
I	INTRODUCTION TO PLANT BIOTECHNOLOGY	<a href="#">Download</a>
II	PLANT TISSUE CULTURE (OVERVIEW)	<a href="#">Download</a>
III	PLANT TRANSFORMATION	<a href="#">Download</a>
IV	MAKING A TRANSGENIC PLANT	<a href="#">Download</a>
V	TRANSGENIC PLANTS: 1st GENERATION	<a href="#">Download</a>
VI	TRANSGENIC PLANTS: 2nd GENERATION	<a href="#">Download</a>
VII	TRANSGENIC PLANTS: 3rd GENERATION	<a href="#">Download</a>
VIII	BIOSAFETY & REGULATION	<a href="#">Download</a>